

Improving Analytical Capabilities of the California Water Plan



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Overview

- Describe Statewide Water Analysis Network (SWAN) and its roles in Update 2009
- New planning approach for the Water Plan
- Scenario analysis from Update 2005
- Developing a proposal for Update 2009



What is SWAN

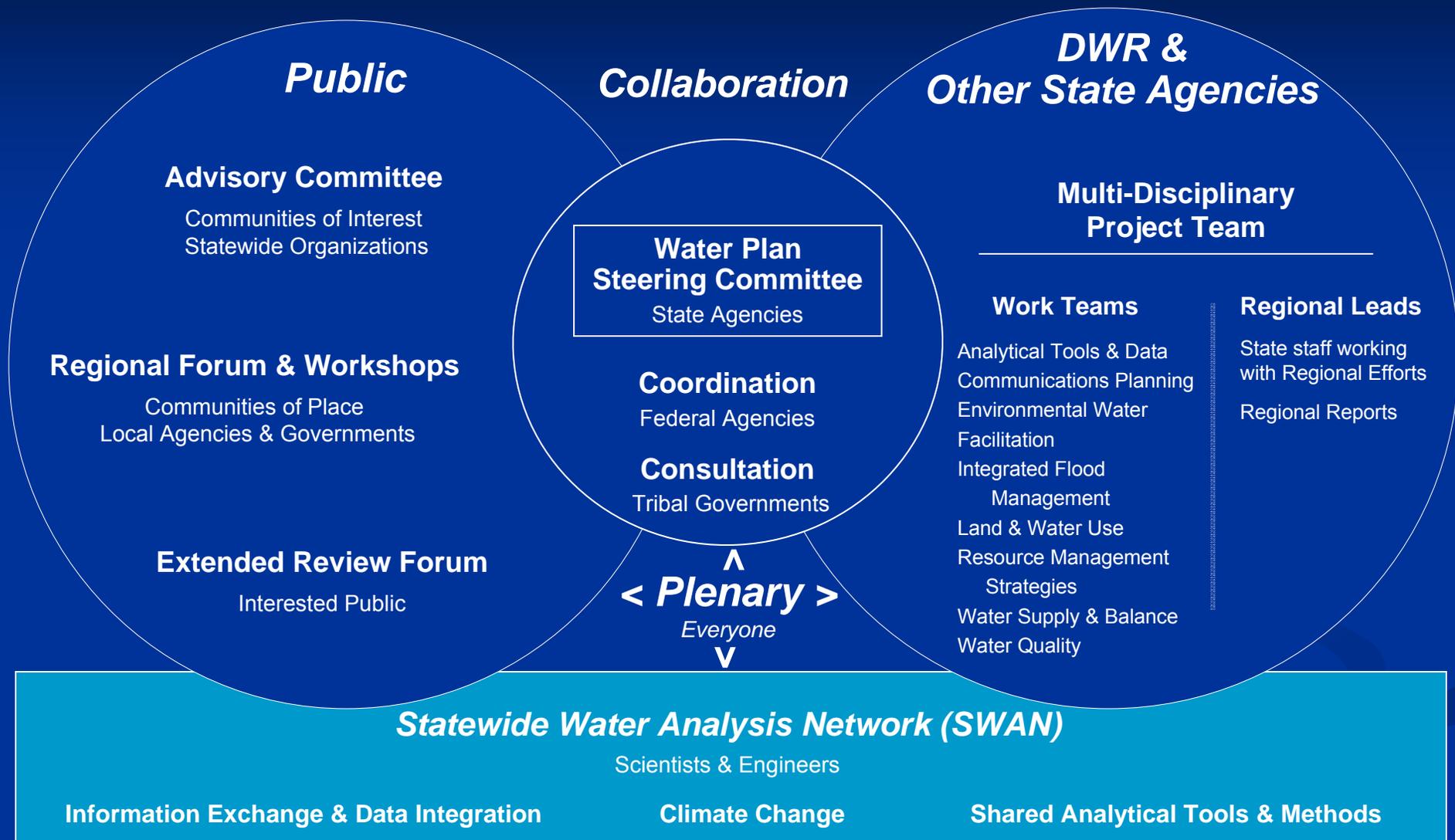


Purpose

- Primary technical advisory group for the California Water Plan
 - Provide recommendations on improvements to analytical tools and data
 - Through Water Plan, recommendations will guide other statewide and regional planning efforts
 - Provide feedback on proposals by Water Plan team



California Water Plan Update 2009 Process Guide



Why a Network?

- Problems identified for Water Plan are not unique
- Solution requires better integration and consistency at federal, state, regional, and local scales
- We have had difficulty reaching consensus on quantitative deliverables
- Expertise and funding are diffuse



How SWAN Can Help

- Build common conceptual understanding of water management system
- Identify appropriate scales for Water Plan analysis
- Develop strategy for making water planning information transparent
- Develop guidelines for integrating information



Needed SWAN Expertise

- Estimating future agricultural, urban, and environmental water demand
- Estimating future management responses
- Considering uncertainty about future climate conditions
- Identifying relationships between management of water, water quality, flood management, and energy
- Data management, visualization, and exchange



SWAN Pilot Studies

- Integrating UWMP's with Water Plan
 - SWAN Workshop (January 2007)
- Common Schematic – TBD
- Common Conceptual Model using Object Oriented Modeling
 - SWAN Workshop (December 2006)



Related Activities

- Southern California Water Demand Study
 - RAND/UCSB (Completed June 2006)
- WEAP Climate Change and Decision Making under Uncertainty
 - IEUA / RAND (Completed June 2007)
- WEAP Climate Change Sac Valley
 - DWR / SEI / NCAR / USEPA (Completed June 2007)
- MOA with Army Corps, IWR
 - (Completed April 2007)

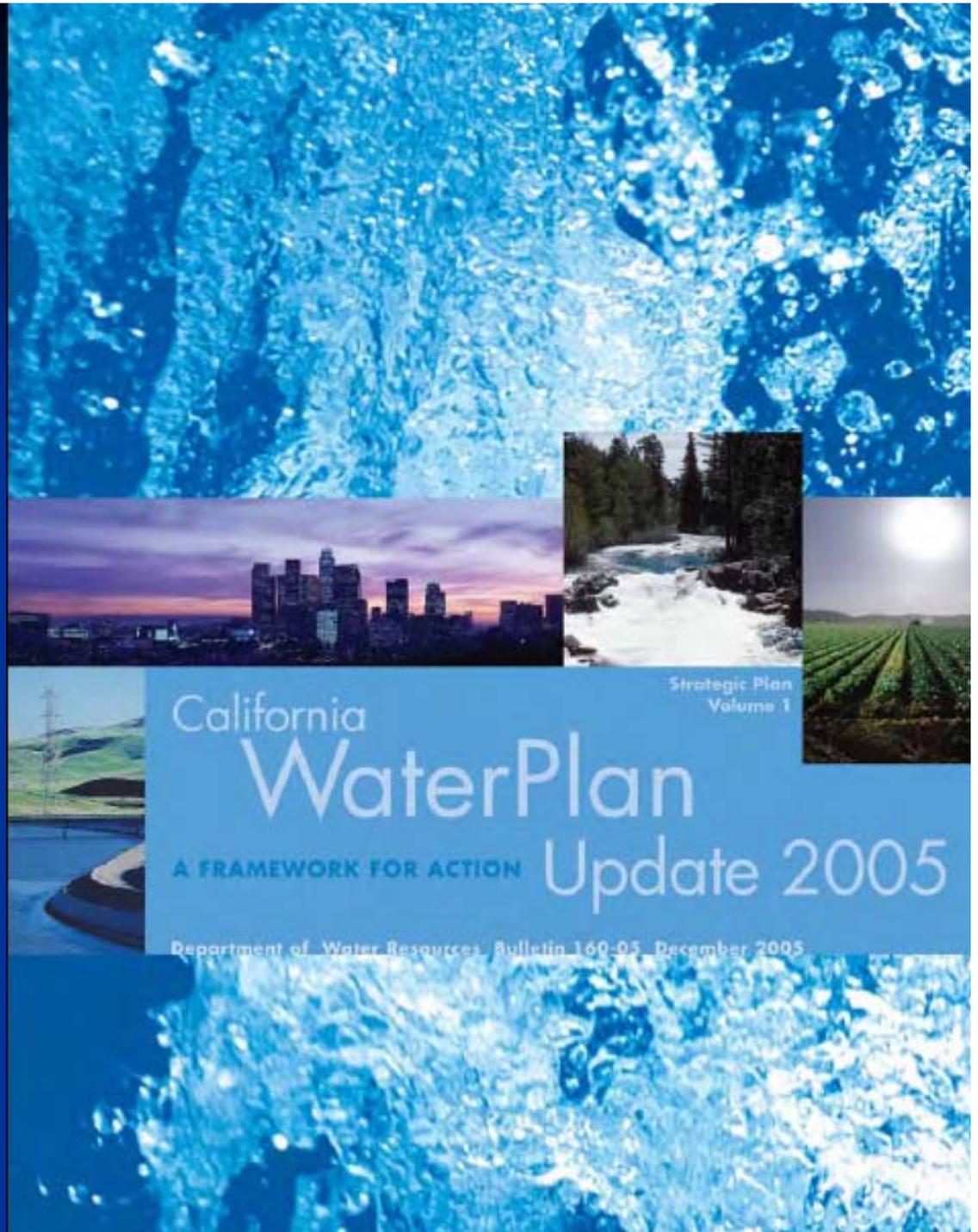


SWAN Activities During Update 2009

- Present results of completed pilot projects
- Implement other pilot studies
- Develop and implement comprehensive strategy Water Plan Update 2009
- Scope out longer term improvements



Outcomes of California Water Plan Update 2005



Recommendation 11

2005 California Water Plan

“DWR and other state agencies must improve data, analytical tools, and information management and exchange needed to prepare, evaluate, and **implement regional integrated resource plans** and programs in cooperation with other federal, tribal, local, and research entities”



Objectives for Water Plan Analysis

- How does water scarcity affect the economy and all beneficial uses?
- How does water quality affect water management and vice versa?
- How does land use affect water management?



Objectives Continued

- How should local, regional, and state agencies manage water during multiple year droughts?
- How will climate change affect water management?
- What are some of the costs, benefits, and tradeoffs between different water management strategies?



Multiple Quantitative Views

- ***Water Portfolios***

- ◆ Describe where water originates, where it flows, and what it is used for based on recent data

- ***Future Baseline Scenarios***

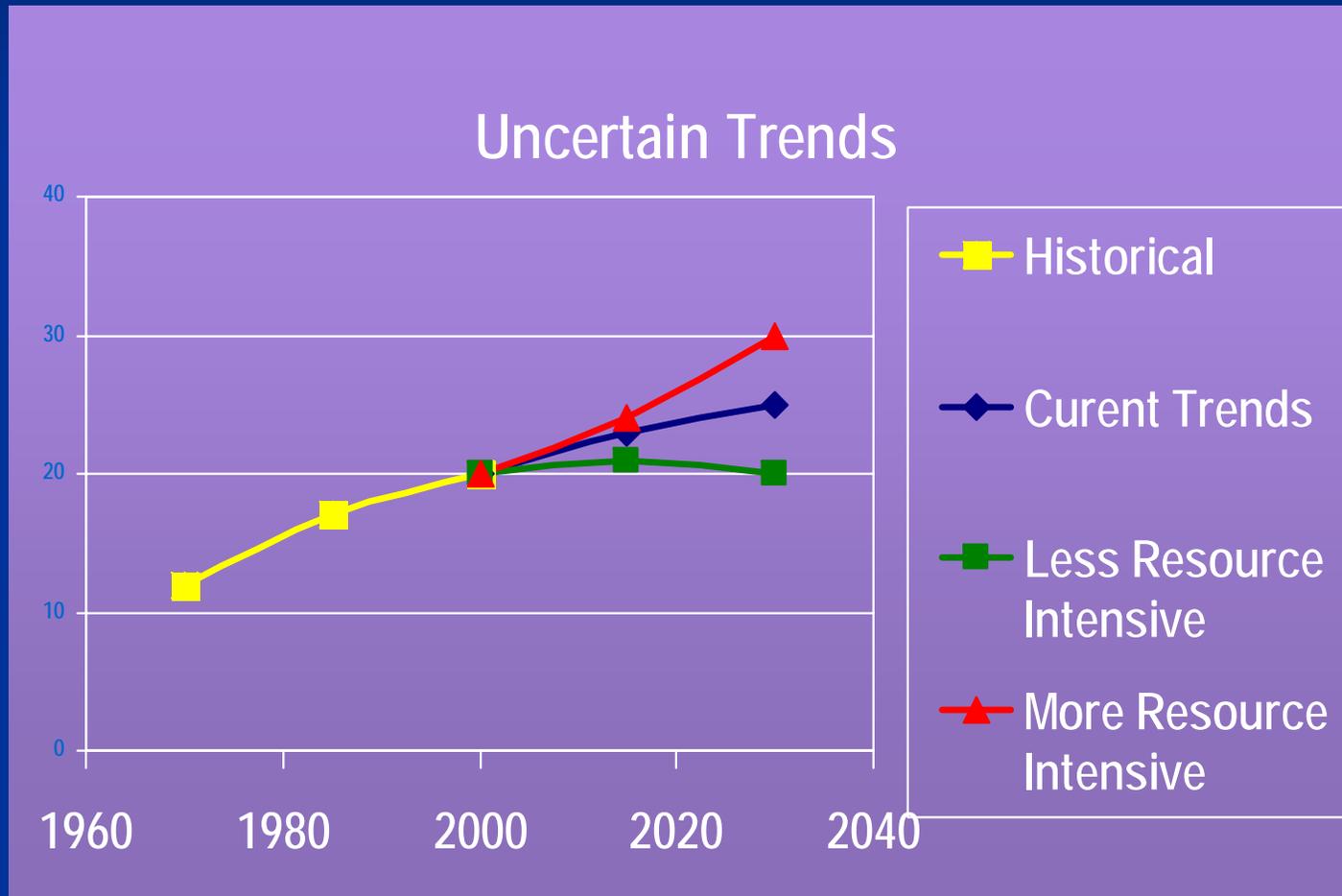
- ◆ Describe expected changes by 2030 if water managers do not take additional action

- ***Alternative Response Packages***

- ◆ Describe packages of promising actions, predict expected outcomes, and compare performance under each scenario



Using Scenarios in the California Water Plan



Background

- In a scenario process, managers invent and then consider, in depth, several varied stories of equally plausible futures. The stories are carefully researched, full of relevant detail, oriented towards real-life decisions, and designed (one hopes) to bring forward surprises and unexpected leaps of understanding
 - Peter Schwartz, “The Art of the Long View, Planning for the Future in an Uncertain World”



Schwartz' View of Scenarios

- Serve as a tool for ordering one's perceptions
- Evaluate different actions or responses based on different plausible futures
- Do not want to pick one preferred future or the most likely future
- Make strategic decisions that will be sound for all plausible futures



Water Plan Scenarios Represent Baseline Conditions

- Water Plan Scenarios only consider conditions that:
 - are plausible during planning horizon under consideration
 - affect future water demands or supplies
 - the water community has little control over



Scenario Narratives Used in Update 2005

- Scenario 1 – Current Trends
- Scenario 2 – Less Resources Intensive
- Scenario 3 – More Resources Intensive



Update 2005

Table of Scenario Factors



FACTOR ¹	SCENARIO 1 CURRENT TRENDS	SCENARIO 2 LESS RESOURCE INTENSIVE	SCENARIO 3 MORE RESOURCE INTENSIVE
Total Population	DOF	DOF	Higher than DOF
Population Density	DOF	Higher than DOF	Lower than DOF
Population Distribution	DOF	DOF	Higher Inland & Southern; Lower Coastal & Northern
Total Commercial Activity	Current Trend	Increase in Trend	Increase in Trend (Same as Scenario 2)
Commercial Activity Mix	Current Trend	Decrease in High Water Using Activities	Increase in High Water Using Activities
Total Industrial Activity	Current Trend	Increase in Trend	(Same as Scenario 2) Increase in Trend
Industrial Activity Mix	Current Trend	Decrease in High Water Using Activities	Increase in High Water Using Activities
Irrigated Crop Area (Includes Irrigated Land Area and Multi-cropped area)	Current Trend	Level Out at Current Crop Area	Level Out at Current Crop Area
Crop Unit Water Use	Current Trend	Decrease in Crop Unit Water Use	Increase in Crop Unit Water Use
Environmental Water-Flow Based	Current Trend	High Environmental Protection	Year 2000 Level of Use
Environmental Water-Land Based	Current Trend	High Environmental Protection	Year 2000 Level of Use
Naturally Occurring Conservation ²	NOC Trend in MOUs	Higher than NOC Trend in MOUs	Lower Than NOC Trend in MOUs
Urban Water Use Efficiency	All Cost Effective BMP's in Existing MOU's Implemented by Current Signatories (present commitments)		
Ag Water Use Efficiency	All Cost Effective EWMP's in Existing MOU's Implemented by Current Signatories (present commitments)		
Per Capita Income	Current Trends		
Ratio of Seasonal to Permanent Crop Mix	Current Trends		
Irrigated Land Retirement	Currently Planned		
Hydrology	Essentially a Repeat of History		
Climate Change	Essentially a Repeat of History		
Colorado River Supply	Equal to 4.4 Plan		
Existing Inter-Regional Import Projects	Current Conditions		
Flood Management	Current capacities, management practices and operations		
Energy Costs	As Projected From Current Trends		
Ambient Water Quality	Current Conditions		
Drinking Water Standards	Current and Planned		
Ag Discharge Requirements	Current and Planned		
Urban Runoff Mgmt.	Current Level of Use		
Recreation	Present Demand Trends Continued		
Desalting	Current Level + Permitted/Financed		
Recycled Water	Current Level + Permitted/Financed		
Water Transfers Within Regions	Currently Approved Transfers		
Water Transfers Between Regions	Currently Approved Transfers		
Conjunctive Use and Groundwater Management	Current Level + Permitted/Financed		
Surface Water Storage	Current Level + Permitted/Financed		
Conveyance Facilities	Current Level + Permitted/Financed		
Rate Structure	Current Practices - pricing constrained to cost recovery		

Scenario Analysis Performed for Update 2005

California Water Plan Update 2005

Quantified Scenarios of 2030 California Water Demand

By David Groves, Pardee RAND Graduate School and Scott Matyac and Tom Hawkins, DWR



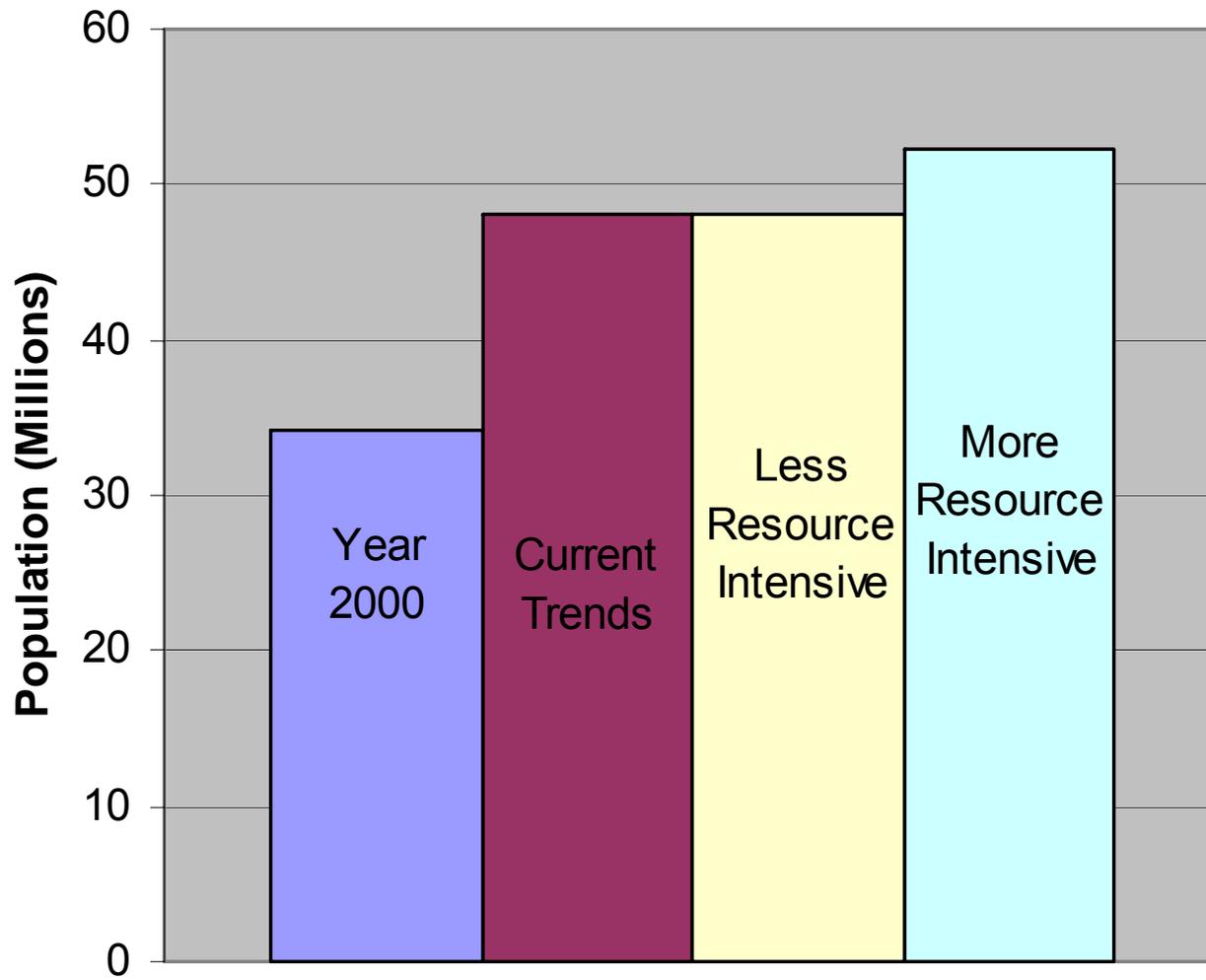
Update 2005 Scenarios

Urban Water Demand Factors

Population Growth	Number of single and multiple family housing units
Number of commercial and industrial employees	Changes in water conservation
Household income	Household size
Water price	



Update 2005 Scenarios Population



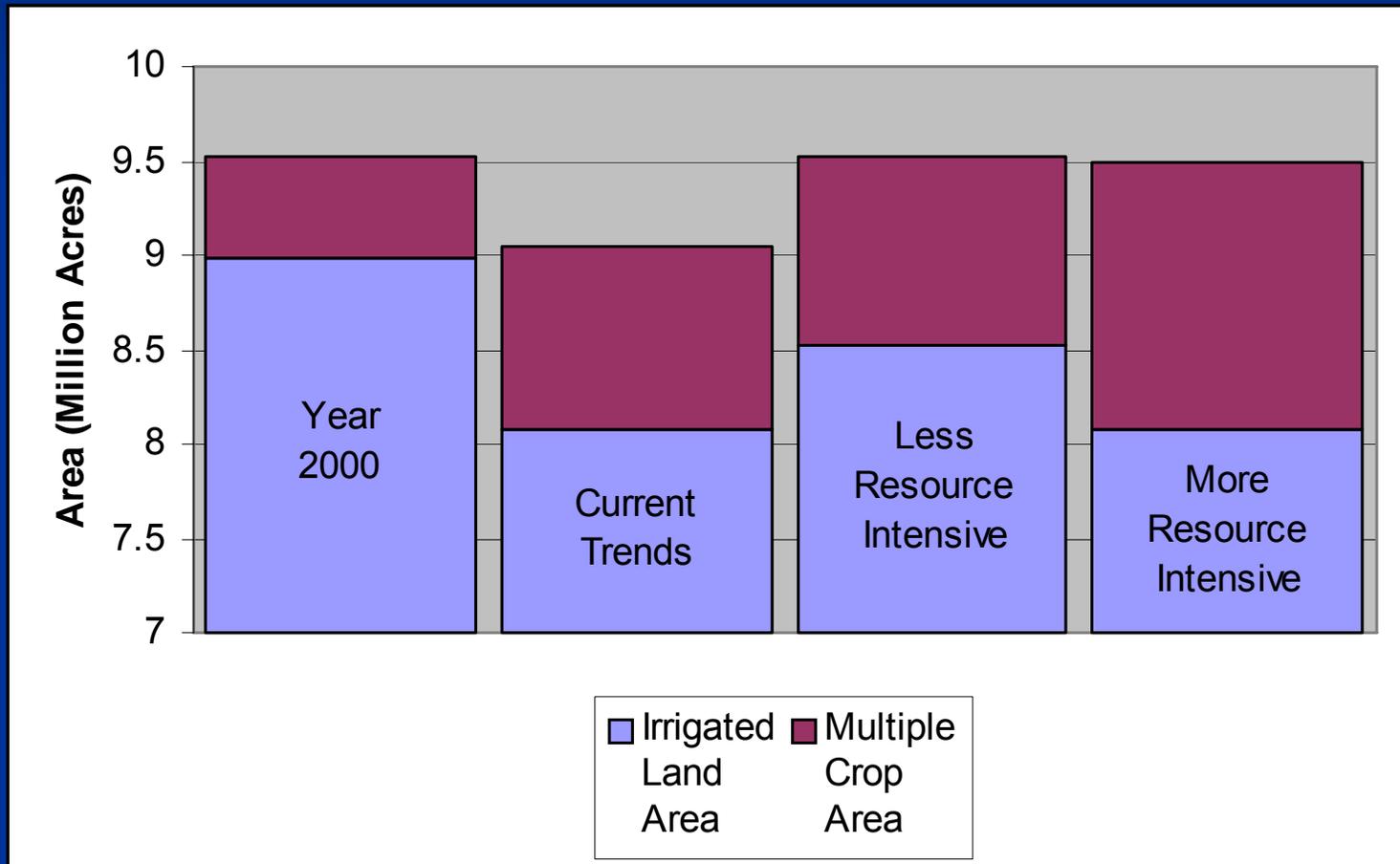
Update 2005 Scenarios

Agricultural Water Demand Factors

Irrigated land area	Crop yield
Multiple crop area	Irrigation practices
Changes in water conservation	Water price
Agricultural economic markets	



Update 2005 Scenarios Crop Area



Update 2005 Scenarios

Information Sources for Environmental Objectives

Trinity River Main stem Restoration Plan ROD	Final Restoration Plan for the Anadromous Fish Restoration Program
Central Valley Project Improvement Act "B2" fishery goals	San Joaquin River restoration goals
Central Valley Project Improvement Act "Level 4" Refuge requirements	CALFED Bay-Delta Program Ecosystem Restoration Program goals
San Joaquin River Vernalis flow goals	

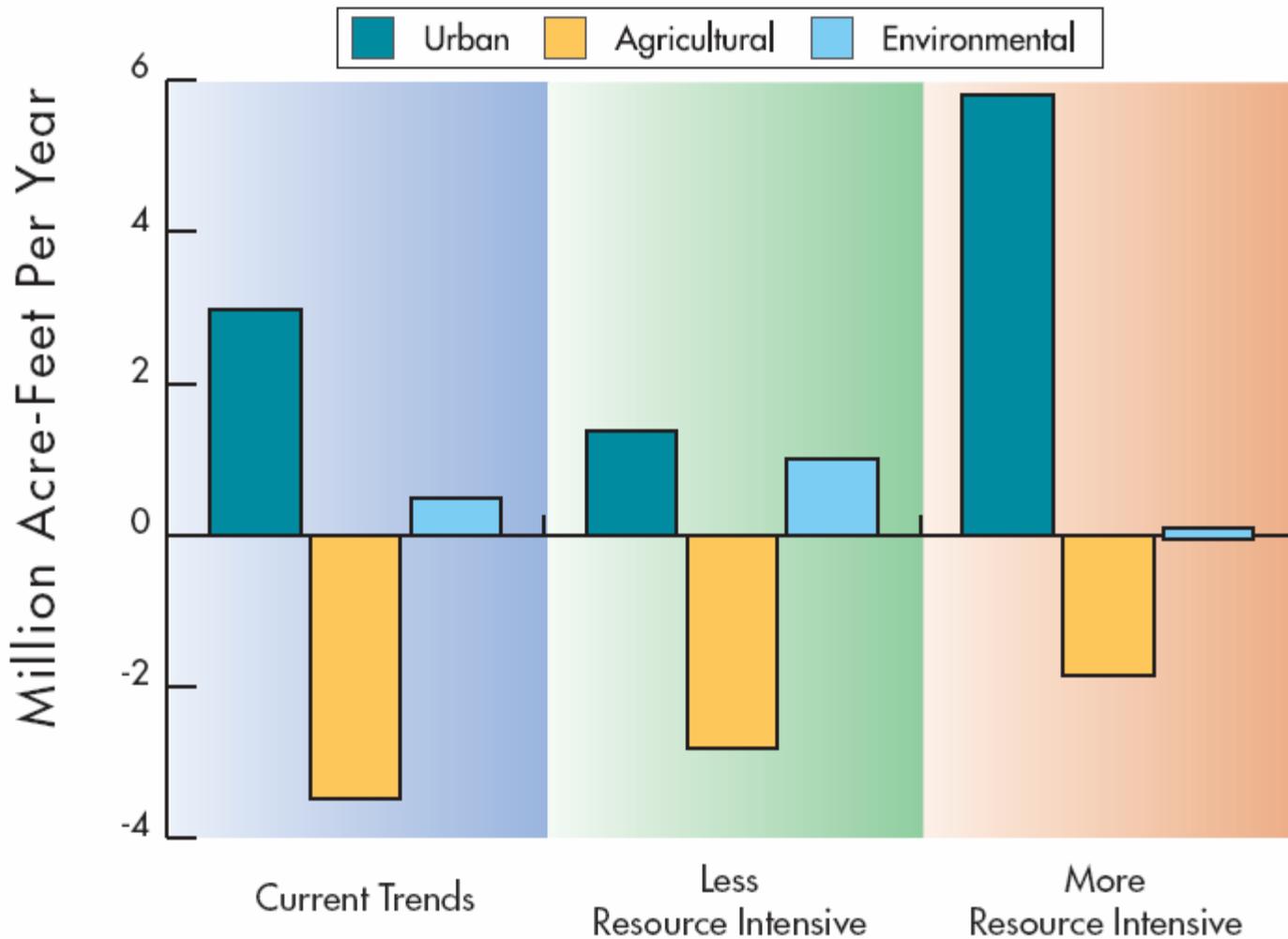
Year 2000 unmet environmental water objectives

Location	Unmet Objective (TAF)
Trinity River (Lewiston)	344
American River (Nimbus)	55
San Joaquin River (Vernalis)	96
San Joaquin River (Below Friant)	268
Stanislaus River (Goodwin)	34
ERP Flow Objective	65
Level 4 Wildlife Refuge Supply	125
Total	987

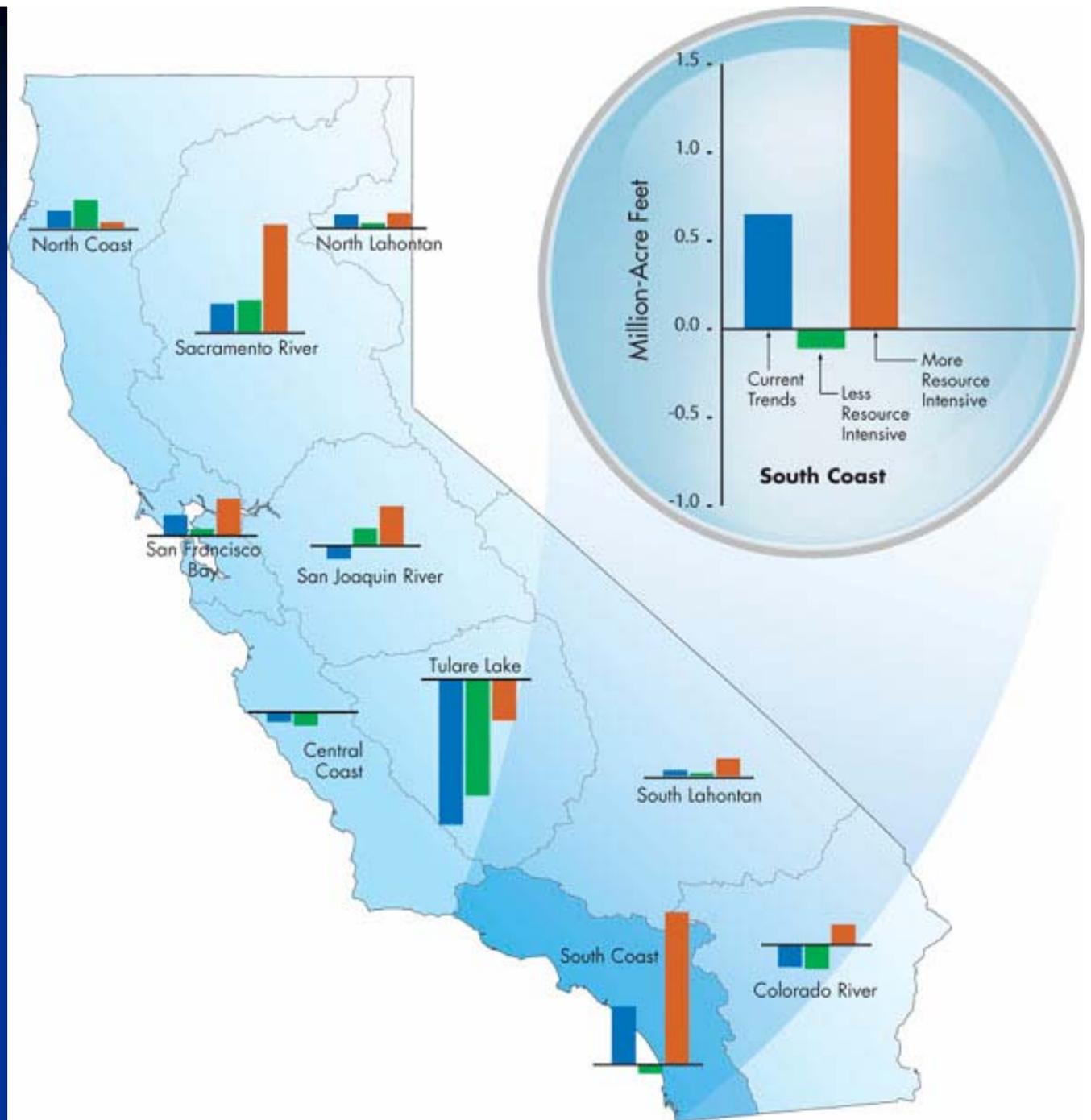


Scenario Demand Changes Statewide

Changes by Sector



Scenario Demand Changes by Region



Update 2009 Scenarios Some Considerations

- Scenario themes and factors
- Planning horizon / Time step
- Climate change
- Drought conditions
- Flood management
- Others?

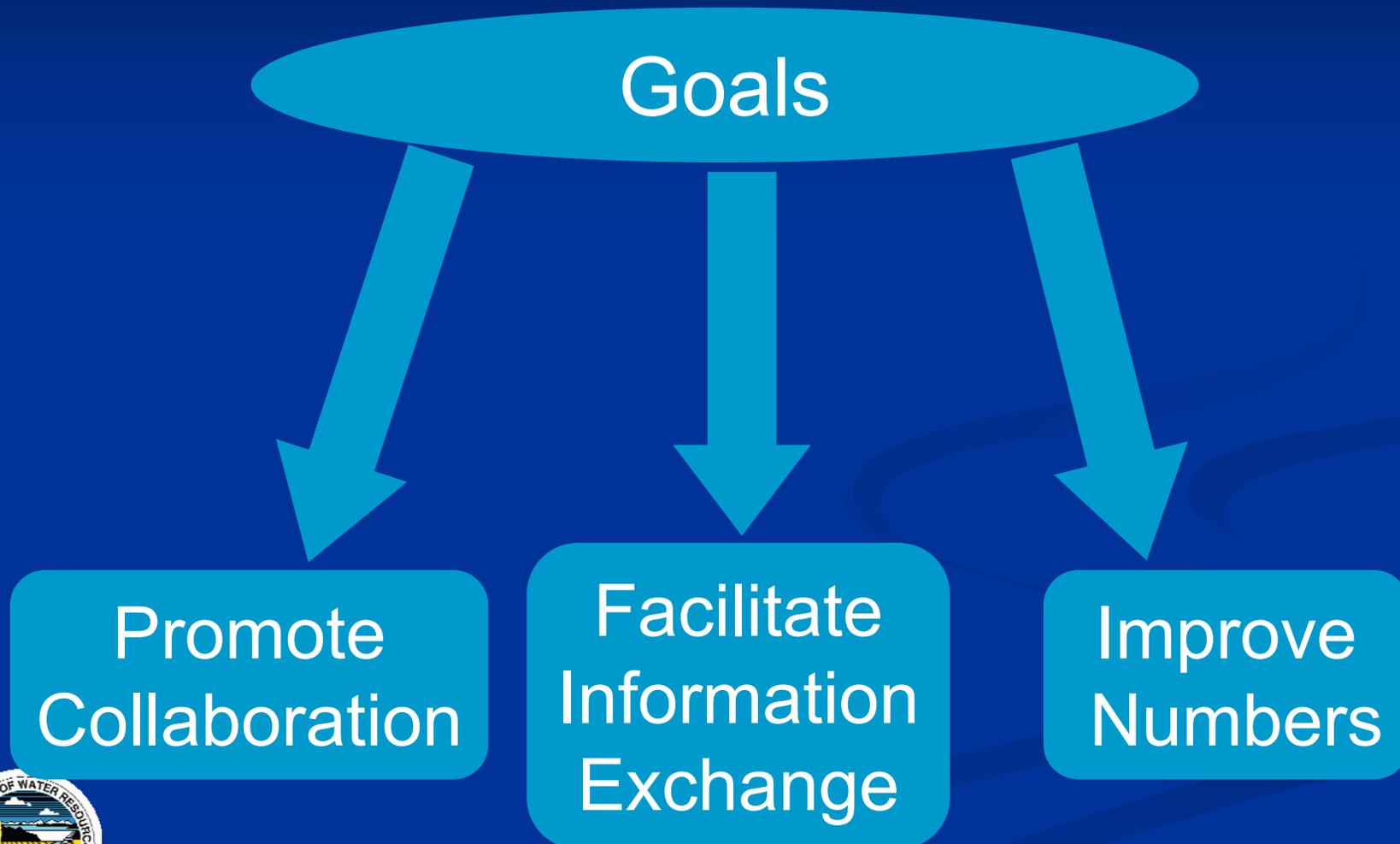


Next Steps on Scenarios

- Develop narrative scenarios
 - Advisory Committee, Regional Forums, and Plenary
- Identify options for quantifying scenarios
 - Statewide Water Analysis Network
- Include scenario narratives and factors in Assumptions and Estimates Report



Implementation



Applying Shared Vision Planning to Develop a Proposal for Update 2009





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What is Shared Vision Planning

Shared Vision Planning incorporates tried and true **planning principles** and **technical analysis** and **collaboration** into a practical forum for making resource management decisions.

Goal - get agreement on the facts so that the discussion can focus on the value conflicts



How Shared Vision Planning Can Help

- Can be applied to any water resource problem where stakeholders are willing to come to the table
- Allows stakeholders to identify what can be done and what ought to be done
- Focuses on facts and data relationships first, then values and tradeoffs
- Provides a method to structure and facilitate the debate
- Integrates policy, collaboration, and technical analysis

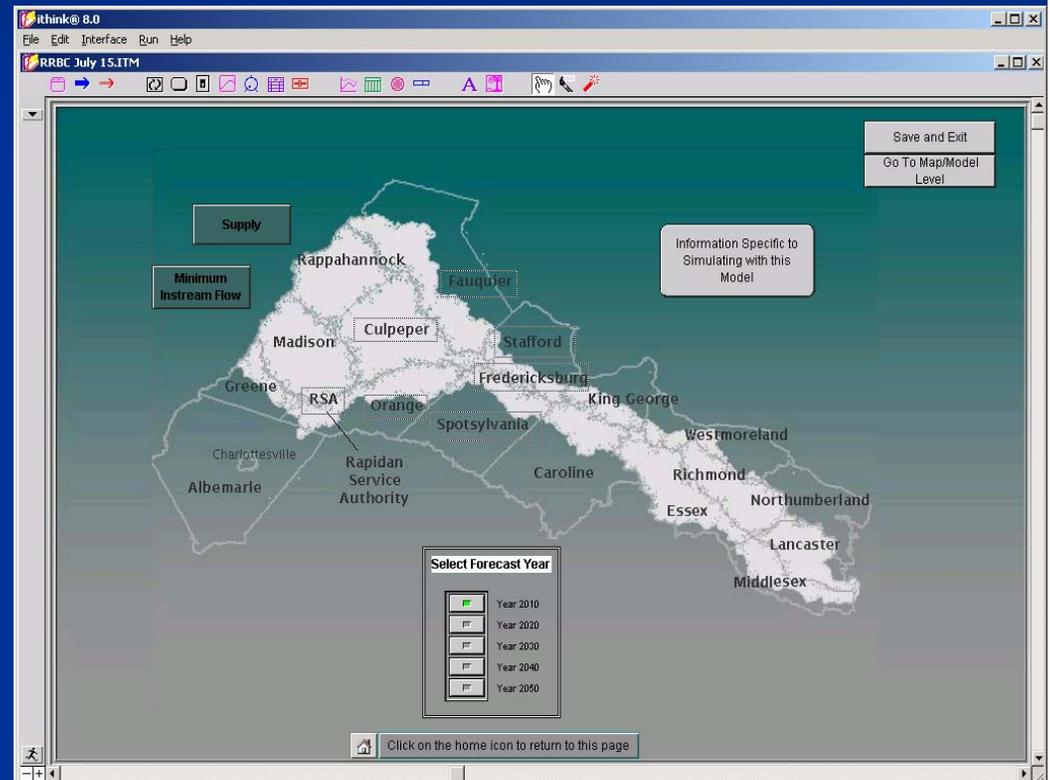




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SVP foundations: Technical Analysis Models

- Models are visual, processes transparent
- Public and experts work together
- Process and model help find win-win solutions



Remember to ask: *“Who will use the model?”* and *“How it will be used?”*

Schedule for Developing Proposal

- December 2007 - Draft proposal
 - Integrate water portfolios, scenarios, and responses
 - Apply shared vision planning approach through SWAN
- March 2008 - Final proposal
- December 2008 – Public Review Draft of CWP Update 2009



Reference Information

- <http://www.waterplan.water.ca.gov>
 - Volume 1, CH 4, Update 2005 – Scenarios
 - Volume 2, Update 2005 – Resource Management Strategies
 - Volume 3, Update 2005 – Water Portfolios
 - SWAN
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Questions?

- SWAN
- Quantitative deliverables
- Developing proposal

Scenario 1

Current Trends

- Recent trends continue for the following:
 - Population growth and development patterns
 - Agricultural and industrial production
 - Environmental water dedication
 - Naturally occurring conservation (like plumbing code changes, natural replacement, actions water users implement on their own)



Scenario 2

Less Resource Intensive

- Includes the following:
 - Recent trends for population growth
 - Higher agricultural and industrial production
 - More environmental water dedication
 - Higher naturally occurring conservation than Current Trends (but less than full implementation of all cost-effective conservation measures available)



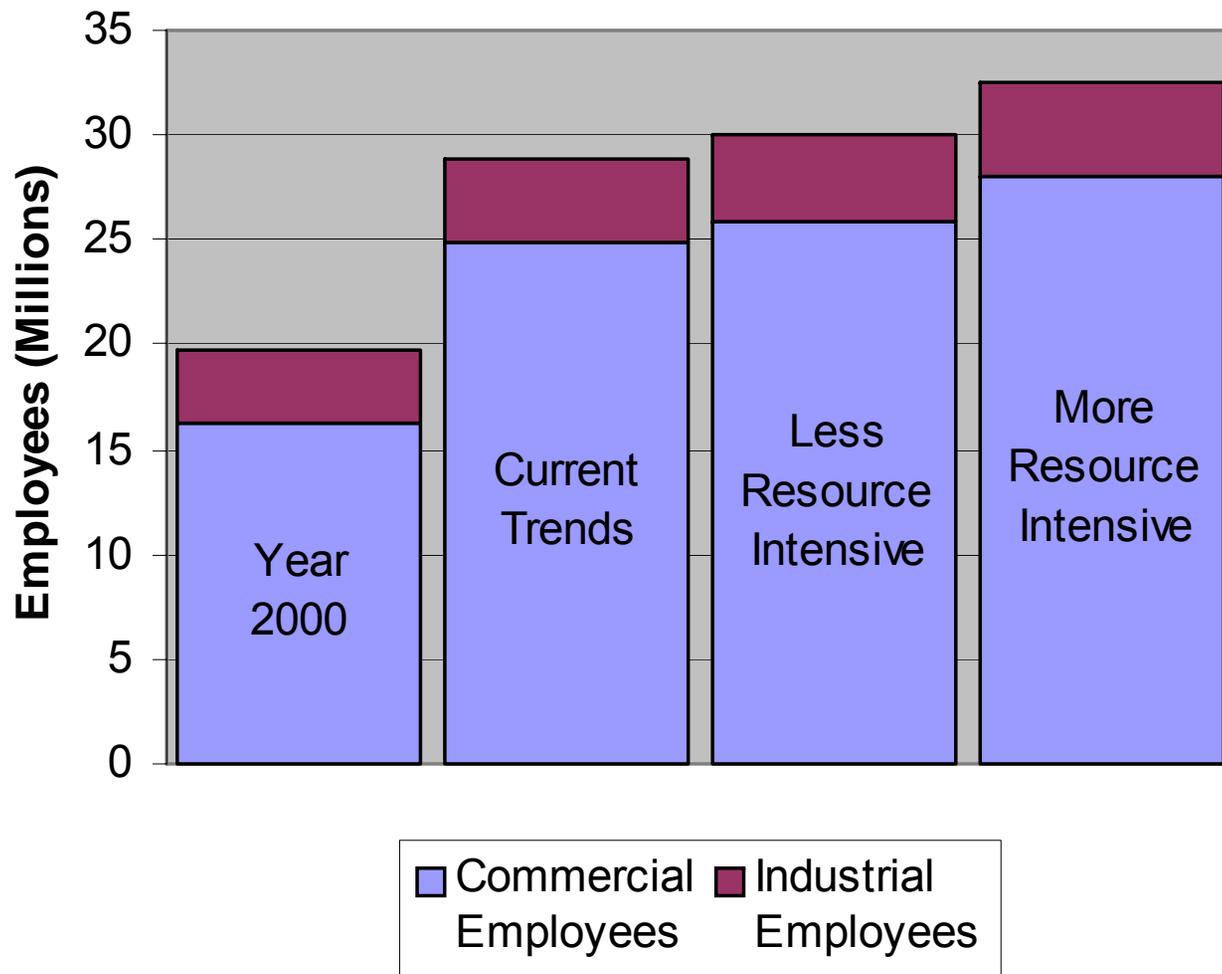
Scenario 3

More Resource Intensive

- Includes the following:
 - Higher population growth rate
 - Higher agricultural and industrial production
 - No additional environmental water dedication (year 2000 level)
 - Lower naturally occurring conservation than Current Trends



Update 2005 Scenarios Employees



Update 2005 Scenarios Housing Units

